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The Facts On File DICTIONARY of COMPUTER SCIENCE

Revised Edition

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some cases they will work very badly or even fail. Steps must be taken to ensure that such cases cannot arise in practice, or can be detected if they do and an alternative heuristic used. Systems based on heuristics often monitor their own performance and adjust their heuristics accordingly. Heuristic methods have been employed, for example, to control the routing of data through computer NETWORKS: the actual performance of a network is used to influence subsequent decisions on routing. Heuristic techniques have also been applied to problems in ARTIFICIAL INTELLIGENCE and to the detection of VIRUSES and SPAM.

hex /heks/ *See* hexadecimal notation.

hexadecimal notation /heks-ă-dess-ă-măl/ (hex) A number system that uses 16 digits and thus has BASE 16. The 16 digits are represented by

0, 1, 2, ... 9, A, B, C, D, E, F

It is a positional notation (*see* number system), positional values increasing from right to left by powers of 16. Hex is a convenient shorthand by which people (rather than computers) can handle binary numbers. Each hex digit corresponds to a group of 4 binary digits, or bits, as shown in the table. Conversion of binary to hex is done by marking off groups of 4 bits in the binary number (starting from the right) and replacing each group by its hex equivalent. Conversion of hex to binary is done by replacing each hex digit by its equivalent binary group. *See also* binary notation.

HEXADECIMAL AND BINARY EQUIVALENTS

Binary	*Hex*	*Binary*	*Hex*
0000	0	1000	8
0001	1	1001	9
0010	2	1010	A
0011	3	1011	B
0100	4	1100	C
0101	5	1101	D
0110	6	1110	E
0111	7	1111	F

hidden file A file that has the hidden attribute set and is not normally visible to users; i.e. is not shown on directory listings or as an ICON when its FOLDER is opened in a window. Files are usually hidden to protect them from deletion or modification and tend to contain critical system code or data. Most file-management utilities allow the user the option to view hidden files.

hierarchical database A type of database that is structured as a TREE: all records, or nodes, have one parent node (except for the root node) and possibly one or more child nodes. No other kind of link between nodes is allowed. Hierarchical databases are less powerful than RELATIONAL DATABASES. *See also* network database.

hierarchical file system A FILESTORE where files are organized in directories (folders) that contain other directories or folders as well as files. The highest level directory is called the *root* and the directories passed through to reach a file is the *path*. Introduced by the Unix operating system in the 1970s, hierarchical file systems are now the norm.

hierarchy of operators The ORDER OF PRECEDENCE of OPERATORS in a particular programming language.

high-definition television *See* HDTV.

high-level language A type of PROGRAMMING LANGUAGE whose features reflect the requirements of the programmer rather than those of the computer. It achieves this by being designed for the solution of problems in one or more areas of application. High-level languages are thus described as *applications-orientated* (or *problem-orientated*). They are easier for the programmer to use than LOW-LEVEL LANGUAGES, being closer to natural language and to the language of mathematics.

The programmer needs little knowledge of the computer on which the program is to run: unlike a low-level language a high-level language does not reflect the facilities provided by computer hardware. Before

other words, it is either part of the user's computer or directly attached to it. *See* remote.
2. In programming, describing a variable that is only defined for one part (subroutine, procedure, or function) of the program and does not have GLOBAL scope.

local area network (LAN) A communication system linking a number of computers within a defined and small locality. This locality may be, say, an office building, an industrial site, or a university. Linking the computers together allows resources, such as HARD DISKS, PRINTERS, or an Internet connection, to be shared between them, allows FILES to be shared, gives all users access to specialized application SERVERS (e.g. database servers that manage shared databases), allows an INTRANET to be established, and permits messages to be sent between the computers by E-MAIL.

The computers in the network are directly connected to the transmission medium by electrical INTERFACES; normally the medium is in the form of electric cables, optical fibers, or wireless. There are various ways in which the interconnections between machines can be organized (*see* network). The system is usually controlled overall by a server that validates all users when they LOG ON and ensures they do not access resources or perform operations forbidden to them. Often, and especially on small networks, this function is combined with that of FILE and PRINT SERVERS on a single machine, known as the server.

Local area networks generally provide high-speed data communications and have very low ERROR RATES. It is possible to interconnect two or more local networks, and to connect a local network to a larger network, i.e. to a WIDE AREA NETWORK.

local bus A PC architecture design that gives high performance by allowing expansion boards to communicate directly with the microprocessor.

LocalTalk /loh-kăl-tawk/ An obsolete cabling system supported by the APPLETALK network protocol for Macintosh computers.

local variable *See* scope.

location (storage location) In general, any place in which information can be stored in a computer – in MAIN STORE or BACKING STORE. A storage location is an area within a computer memory capable of storing a single unit of information in binary form. Each location can be identified by an ADDRESS, allowing an item of information to be stored there or retrieved from there. In most cases it is possible to change the stored value during execution of the program. The words location and address are often used as synonyms, as in ordinary speech.

Main store is divided into either WORDS or BYTES: in some computers each location holds a word; in other machines each location holds a byte. The memory is said to be *word-addressable* or *byte-addressable*. A word is now generally 32 bits and is usually large enough to contain a MACHINE INSTRUCTION. A byte is always 8 bits and thus is the storage space required to hold a small number or a common CHARACTER.

Locations on disk and tape hold a number of bytes and are addressed by TRACK and SECTOR or by BLOCK, respectively.

lock 1. A mechanical device on some removable storage media that prevents the user writing to the media.
2. A software security feature that ensures it cannot be used unless unlocked with a key or DONGLE.

locked up The condition of a system or an application that seems unable to respond to the user. *See also* hang.

log /log/ A record containing details of past activities or actions on a computer system, e.g. details of problems found (or not) and actions taken when scanning a disk.

logic /loj-ik/ *See* binary logic; digital logic.

logical device /loj-i-kăl/ A device that is given a logical name or number and is treated by the operating system as a distinct device regardless of its physical